Claims

[c1]   Wherefore, having thus described the present invention, what is claimed

is:

1. A computer-implemented process for viewing and controlling an animation

sequence comprising the process actions of:

displaying an event list containing one or more animation events in an ordered

sequence; and wherein

an event timeline graphically depicting the timing of the animation event can be

displayed for each animation event.

[c2]   2. The process of Claim 1 wherein a logical relationship is defined between one

animation event in the event list and another animation event in the event list,

and wherein said logical relationship is usable in manipulating the ordered

sequence.

[c3]   3.The process of Claim 2 wherein the logical relationship comprises one of:

starting said animation event with a previous event, which causes said

animation event to start at the same time as the immediately previous

animation event in the ordered event list;

starting said animation event after completion of a previous animation event,

which causes said event to start after completion of an immediately previously

scheduled event in the ordered sequence;

starting said animation event on an input device action, which causes said

animation event to start after a specific number of input device actions have

been completed;

starting said animation event after a delay having a specified duration; and

starting said animation event upon the initiation of another triggering event.

[c4]   4.The process of Claim 2 wherein an animation event in the event list is

associated with an indicator that represents said logical relationship between

said animation event and at least one other animation event in the event list and

wherein said indicator is displayed in close proximity to the associated

animation event in said event list.

[c5]   5.The process of Claim 4 wherein

the indicator representing the logical relationship of starting an animation event with a previous animation event is a blank space; and wherein, the indicator representing the logical relationship of starting an animation event after a previous animation event is a clock.

[c6]   6.The process of Claim 1 further comprising a graphically-depicted universal timeline that provides a time corresponding to all animation event times in the ordered sequence.

[c7]   7.The process of Claim 6 wherein each said animation event in said event list is depicted by an event timeline bar which indicates the animation event's start time, stop time and duration, each event timeline bar being correlated to said universal timeline.

[c8]   8.The process of Claim 7 wherein the event timeline bars are horizontally depicted and wherein said event can be manipulated by at least one of: selecting and dragging said left edge of said event timeline bar with an input device to move the start time of said animation event either earlier or later in time, selecting and dragging said right edge of said event timeline bar with an input device to move the end time of said animation event either earlier or later in time; and selecting and dragging said entire event timeline bar with an input device to move said event later or earlier in time.

[c9]   9.The process of Claim 7 wherein the event timeline bars are horizontally depicted and wherein the start time of an event bar is numerically indicated in a pop up window when the left edge of the event bar is selected with an input device; and wherein the end time of an event is numerically indicated in a pop up window when the right edge of the event bar is selected with an input device; and wherein the duration of an event is numerically indicated in a pop-up window when the center of the event bar is selected with an input device.

[c10]

10.The process of Claim 2 wherein the logical relationship between animation

events in the event list can be changed by activating a context-sensitive menu.

[c11]   11.The process of Claim 2 wherein the logical relationship between animation events in the event list is maintained when the order of an animation event in the event list is changed by selecting and dragging the animation event up or down the event list with a computer input device to change its order in the ordered sequence.

[c12]   12.The process of Claim 1 wherein an event can be created to repeat itself.

[c13]   13.The process of Claim 10 wherein the context-sensitive menu contains menu items to allow setting the logical relationship of a selected event to:

start with a previous animation event;

start after a previous animation event;

start after a specific number of input device selection actions;

start after a specified delay; and

start upon the initiation of a triggering event.

[c14]   14.The process of Claim 7 wherein if the logical relationship between animation events is changed the event timeline bars are automatically redrawn to show the new logical relationship based on a set of logic constraints.

[c15]   15. The process of Claim 14 wherein the logic constraints comprise at least one of:

a) a first event in the ordered sequence is never constrained;

b) an event set to start with a previous animation event is not constrained to another event that is set to start with a previous animation event;

c) a logical relationship that causes an animation event to start with a previous animation event forces the corresponding event to default to start at the start time of a previous event ;

d) an animation event that is set to start with a previous animation event cannot be retimed to start prior to an animation event that requires that the animation event start after a previous event;

e) an animation event that is set to start with a previous animation event cannot be set to start prior to an event that is required to start after a previous

animation event;

f) an event preceding an event that is set to start after a previous animation event must start either at the same start time, or later;

g) an event set to start after a previous animation event starts following the longest duration event of any event that is to start with a previous event in the prior block or group, up to the last "after previous" event timeline; and

h) an event that has no duration, is treated as having an end time the same as its start time and setting an animation event to start after a previous event in this case sets the constraint to the start of the timeline.

[c16]   16. The process of Claim 3 wherein if a start time, end time or duration of an animation event is changed all events in said ordered sequence will automatically adjusted based on the logical relationship between the animation events.

[c17]   17. The process of Claim 6 wherein when one of said animation events in said event list is selected with an input device, a corresponding portion of the universal timeline is displayed.

[c18]   18. The process of Claim 4 wherein the number of indicators associated with an animation event is determined by the width of a display area available for displaying information associated with the event list.

[c19]   19. The process of Claim 18 wherein the number of indicators associated with each event in the event list displayed is increased when the width of the display is expanded, and the number of indicators associated with each event in the event list displayed is decreased when the width of the display is decreased.

[c20]   20. The process of Claim 4 wherein the number of animation events displayed in the event list is determined by the height of a display area available for displaying information associated with the event list.

[c21]   21. The process of Claim 20 wherein the number of animation events displayed is increased when the height of the display is expanded, and the number of animation events displayed is decreased when the height of the display is decreased.

[c22]   22.The process of Claim 1 wherein the user can use keyboard keys to manipulate events in the event list.

[c23]   23.A computer-readable medium having computer-executable instructions for controlling and displaying a sequence of events, said computer executable instructions comprising:
displaying a list of events in time ordered sequence in an event list;
defining at least one logical relationship between events;
using said at least one logical relationship to automatically modify the ordered sequence according to a list of logic constraints if a change is made to one event that affects other events in the event list.

[c24]   24.The computer-readable medium of Claim 23, further comprising computer executable instructions comprising:
displaying an event timeline graphically depicting the timing of said event.

[c25]   25.The computer-readable medium of Claim 24 further comprising allowing a user to manipulate the events in the ordered sequence using said event list or said event timeline.

[c26]   26.The computer-readable medium of Claim 23 wherein when the logical relationship of one of said events in said event list is changed, the corresponding ordered sequence is changed.

[c27]   27.The computer-readable medium of Claim 23 wherein the at least one logical relationship comprises one of:
starting said event with a previous event, which causes said event to start at the same time as the immediately previous event in the ordered event list;
starting said event after completion of a previous event, which causes said event to start after completion of an immediately previously scheduled event in the ordered sequence;
starting said event on an input device action, which causes said animation event to start after a specific number of input device actions have been completed;
starting said event after a delay having a specified duration; and
starting said event upon the initiation of another triggering event.

[c28]   28. The computer-readable medium of Claim 23 wherein the logic constraints comprise at least one of:

a) a first event in the ordered sequence is never constrained;

b) an event set to start with a previous event is not constrained to another event that is set to start with a previous event;

c) a logical relationship that causes an animation event to start with a previous animation event forces the corresponding event to default to start at the start time of a previous event ;

d) an animation event that is set to start with a previous animation event cannot be retimed to start prior to an animation event that requires that the animation event start after a previous event;

e) an animation event that is set to start with a previous animation event cannot be set to start prior to an event that is required to start after a previous animation event;

f)an event preceding an event that is set to start after a previous animation event must start either at the same start time, or later;

g) an event set to start after a previous animation event starts following the longest duration event of any event that is to start with a previous event in the prior block or group, up to the last "after previous" event timeline; and

h)an event that has no duration, is treated as having an end time the same as its start time and setting an animation event to start after a previous event sets the constraint to the start of the timeline.

[c29]   29.A system for displaying and controlling an animation sequence, the system comprising:

a general purpose computing device; and

a computer program comprising program modules executable by the computing device, wherein the computing device is directed by the program modules of the computer program to,

display an event list containing at least one event in an ordered sequence on a display device; and

display a timeline correlating to said at least one event in said event list.

[c30]   30.A computer-implemented process for controlling a timeline comprising the

process actions of:

displaying a scroll bar representing a timeline wherein a control is overlaid on said timeline; and

controlling the time selected on the timeline by moving the control to overlay the desired time.

[c31]   31. The process of Claim 30 further comprising the process action of: automatically displaying at least one event associated with said desired time once the desired time is selected.